Remarks

Thorough examination by the Examiner is noted and appreciated.

Applicants have amended independent claims 16 and claim 20 to include the limitations of dependent claims 17 and 21, respectively, to achieve indicated allowable subject matter. Applicants have further amended independent claims 1, 10, and 13 to define over the cited art and have added new claims 24-28.

No new matter has been added.

For example, support for the amended and new claims is found in the previously presented claims and in the Specification at:

paragraph 0031:

"When employed in the inventive system, a slip clutch 72 is normally engaged so as to transmit all of the torque produced by the ICE 10 or the motor 54 to the wheels 68. **In the event of a braking event that generates a reactive torque exceeding the "preset" value, the clutch 72 slips in response to the reactive torque applied to its output, thereby preventing this reactive**

torque from being transmitted upstream in the driveline. In effect, the reactive torque causes the slip clutch 72 to partially disengage the wheels 68 from the driveline upstream of the clutch 72."

paragraph 0034:

"In a simple implementation of the invention, reactive torque limiting is achieved using a passive system which is activated directly and solely by the imposition of a certain magnitude of reactive torque on the output shaft of the clutch 72. The torque transmitting ability of the slip clutch 72 is set at a value that is sufficient to transmit "positive" torque from the powertrain to the traction wheels 68 under a range of normal operating conditions, as well as negative torque from the wheels 68 to the powertrain 74 during regenerative braking; however, **this preset torque level is also chosen such that excessive torque levels i.e. those created during sudden braking are not transmitted back to the powertrain** 74. Thus, as shown in FIG. 2, when a braking event creates reactive torque at the wheels 68, the clutch responds directly to this event by slipping, **so as to limit or eliminate** transmission of the reactive torque to the driveline components and the powertrain 74 upstream of the clutch 72. In this embodiment of the invention, the level of reactive torque which causes the clutch 72 to slip is fixed or preset."

paragraph 0033:

"Other types of torque limiting devices can be used in the present invention. For example the clutch 72 may be a magnetic clutch which uses electromagnetic force to connect input and output shafts; a reactive counter-torque applied to the output shaft **which exceeds the applied electromagnetic clutch force results in slippage between the input and output shafts of the clutch**. In the illustrated embodiment, where the wheels 68 drive the motor 54 in a regenerative braking mode, it is important that the clutch 72 be of a type capable of transmitting both positive and negative torque. In other words, the clutch 72 must transmit torque from the powertrain 74 to the wheels

68 and from the wheels 68 back to the powertrain 74."

paragraph 0038:

"The use of the controller 76 to dynamically adjust clutch pressure provides the control system with additional flexibility, and accommodates a wide variety of operating conditions where it is desirable to clutch pressure because of dynamic and unpredictable operating conditions. Thus, for example, **when certain vehicle sensors predict that a sudden braking event is likely to occur, the controller 76 can command the adjustor 114 to change the clutch pressure to a first readiness level.** When other events are sensed suggesting that the **braking event has commenced, the controller 76 can issue a second command to the adjustor 114 that results in the clutch pressure being reset to a second readiness level. In addition to** preparing the clutch 72 for a sudden braking event by changing the clutch pressure **in advance of the event,** the active control system described above can be employed **to dynamically adjust clutch pressure during the braking event.** Such dynamic clutch control may be advantageous in a variety of applications, such as where dynamic control of the reactive torque is used in concert with the vehicle's ABS system to enhance vehicle braking."

Paragraph 0040:

"Attention is now also directed to FIG. 6 which shows the basic steps employed in carrying out the control method of the invention. First, the brake and other systems on the vehicle are

monitored to determine whether a sudden braking event has occurred, is about to commence, or could potentially occur in the immediate future. As previously discussed, this monitoring function is performed by any a variety of sensors on the vehicle which feed information to the controller 76. The events or conditions being sensed may be prioritized into two or more groups. Thus, 1st level events are sensed at 94, such as those suggesting that a sudden braking event is likely to occur or may be eminent. Upon sensing one or more 1st level events, the controller 76 issues a command to the adjustor 114 which in turn adjusts the pressure of the clutch 72 to a 1st level, as shown at step 96. Then, when the system senses a 2nd level event at step 98, typically a condition indicating that sudden braking has actually commenced, the clutch pressure is adjusted to a second level as shown at step 100. The system continues the monitoring process **until the events giving rise to clutch pressure adjustment have ended**, as shown at step 102. If the events have not ended, the last clutch pressure setting is maintained, as shown at step 106. However, **if the events have ended, then the clutch pressure is reset to its normal value, as indicated at step 104.**"

Claim Rejections under 35 USC 102

1. Claims 1-9 stand rejected under 35 USC 102(b), as being anticipated by Aoyama (JP06094122).

Aoyama discloses a **lock-up clutch** connected to an internal combustion engine (i.e., on a drive motor side of a gear assembly (transmission) connected to the drive train) that can be retained in a coupling state or at a predetermined slip rate to **reversibly drive an internal combustion engine** by torque **originating from** a

drive wheel side of the clutch during ordinary deceleration in order to improve fuel efficiency (see Abstract). In operation, when throttle closure is detected, it is then determined whether it corresponds with a sudden deceleration event or an ordinary deceleration event. **If a sudden deceleration event is determined, a slip rate of the clutch is increased.** If an ordinary deceleration event is determined, the clutch is retained in a coupling state **or a predetermined slip rate to reversibly drive an internal combustion engine** by torque generated on the drive wheel side of the lock-up clutch (see narrative/ constitution).

Aoyama fails to disclose several aspects of Applicants disclosed and claimed invention including those elements in **bold type**:

"A method of limiting including **eliminating reactive torque transmitted** from a set of driven traction wheels to a powertrain during a sudden braking event, comprising:

slipping a drive component comprising a clutch disposed between the traction wheels and the powertrain during the sudden braking event, **to thereby eliminate an amount of reactive torque**

at and above a first value of reactive torque transmitted from the traction wheels to the powertrain, said drive component disposed on the traction wheel side of said powertrain, **said powertrain comprising a first gear assembly connected to a drive motor;**

wherein said clutch is adjusted to slip at a slip level at and above said first value of reactive torque, said adjustment **prior to commencement of said sudden braking event.**

Aoyama teaches that the lock up clutch can either be retained in a coupling state (non-slip state) **or** at a predetermined slip rate **to reversibly drive an internal combustion engine** by torque **originating from** a drive wheel side of the clutch **during ordinary deceleration** in order to improve fuel efficiency.

Aoyama further teaches **in the event of a sudden deceleration event is determined, a slip rate of the clutch is increased.**

Aoyama does not teach or suggest "A method of **eliminating** reactive torque transmitted from a set of driven traction wheels to a powertrain during a **sudden braking event**" or where "wherein

said clutch is adjusted to slip at a slip level **at and above** said first value of reactive torque, said adjustment **prior to commencement of said sudden braking event.**"

Thus, the disclosure of Aoyama is clearly insufficient to anticipate Applicants disclosed and claimed invention.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claim Rejections under 35 USC 103

3. Claims 10-16, 20, 22, and 23 stand rejected under 35 USC 103(a), as being unpatentable over Aoyama, above, in view of Matsubara et al. (US 5,989,156).

Applicants reiterate the comments made above with respect to Aoyama.

Even assuming *arguendo*, a proper motivation for combination other than Applicants disclosure, the fact that Matsubara et al. further teach a **lock-up clutch slip control system where the lock-up clutch is between the engine and in parallel with the transmission** to **minimize output fluctuations of the engine** (prime mover) when **changing from full lock-up to slip control in the clutch** (due to engine output changes) **by further controlling the output of the engine** in response to a change in slip control of the clutch **to prevent abrupt torque fluctuations of the engine** (see Abstract; col 1, lines 5-8, lines 27-34, lines 51-col 2-line2; col 4, lines 64-66; col 8, lines 60-65, col 11, lines 46-54), and further discloses that such a system may be used to suppress torque fluctuations in engines in a hybrid vehicle e.g., where an internal combustion engine and electric motor are combined (col 11, line 61 -col 12, line 7), does not further help Examiner in producing Applicants disclosed and claimed invention or making out a *prima facie* case of obviousness.

"Finally, the prior art reference (or references when

combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).*

Conclusion

The cited references, either individually or in combination, do not produce Applicants disclosed and claimed invention, and are therefore insufficient to make out a *prima facie* case of anticipation or obviousness with respect to both Applicants independent and dependent claims.

Applicants gratefully note the indication of allowable subject matter in claims 17-19 and 21.

Applicants have amended independent claims 16 and claim 20 to include the limitations of dependent claims 17 and 21, respectively, to achieve indicated allowable subject matter. Applicants have further amended independent claims 1, 10, and 13 to define over the cited art and have added new claims 24-28.

A favorable reconsideration of Applicants' claims is respectfully requested.

Based on the foregoing, Applicants respectfully submit that the Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention as claimed is not in condition for allowance for any reason, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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